

Appl. No. 09/241,450
Amdt. dated September 16, 2005
Reply to Office action of June 17, 2005

REMARKS

Reconsideration of this application is respectfully requested.

Claims 1-9 and 29-41 were pending. Claims 1-9 and 29-41 were rejected.

REJECTION UNDER 35 U.S.C. § 103

Claims 1-9 and 29-38 were rejected under 35 U.S.C. § 103 as being unpatentable over Green. et al. (US 5,397,631). The independent claims have been amended to require that the body layer comprises insulation having a density of about 0.5 to 7 pounds per foot³, and a thickness of at least about 0.5 inch (1.3 cm). Applicant submits that the claims should be allowable over Green et al. in view of the foregoing amendments and the following remarks.

Amended claim 1 requires:

the body layer comprises insulation having a density of about 0.5 to 7 pounds per foot³, and a thickness of at least about 0.5 inch (1.3 cm); and
(b) a cover layer of a solid of a cured liquid cast on the roughly textured face,
in which the cover layer has a thickness dimension which is substantially uniform and
in which the cover layer is permanently embedded into the body layer from the roughly textured face to a depth less than the thickness dimension.

The claimed product comprises insulation having a density of 0.5 to 7 pounds per foot³, and a thickness of at least about 0.5 inch (1.3 cm). Thus, the claims cover materials ranging from low density products (including insulation materials suitable for use as batting/blankets) to higher density products (including duct boards and duct liners).

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Green et al. neither discloses nor suggests the claimed product. Nor would it have been obvious to modify the teachings of Green et al. to arrive at the claimed product.

Green is directed to a coated fibrous mat faced gypsum board suitable for use as a tile backer. Green et al. describe tile backer products at

The usual construction of bathroom walls includes a multi-ply structure of ceramic tile adhered to an underlying base member, for example, a panel of wallboard comprising gypsum or other material as will be described below. Such a panel is referred to ... herein as "tile backer". In usual fashion, sheets of tile backer (for example, 4' x 8' x 1/2") are fastened by rust-resistant nails or screws to studs. Blocks of ceramic tiles (for example, 4" x 4") are adhered to the sheets of tile backer by water-resistant adhesive which is referred to in the industry as "mastic" or by a Portland cement-based adhesive which is referred to commonly as "thin set mortar". Thereafter, spaces between the tiles and between the tiles and other adjoining surfaces, for example, the lip of a bathtub or sink, are filled with a water-resistant material which is referred to in the industry as "grouting".

Green et al. note the importance of providing a product suitable for use as a tile backer:

Of primary importance is that the coated board has superior water-resistant characteristics, and accordingly, can be used effectively for indefinite periods of time as a stable substrate supporting ceramic tiles or other water-resistant materials which are likely to be used in applications involving water contact and high humidity. [Emphasis added]

The Examiner alleges that Green et al. taught the features of claims 39-41 (some subject matter of which is now included in claims 1 and 29), stating, "the Examiner is equating the fibrous mats of Green et al. to be the same as the newly claimed insulation batting." However, the prior art neither disclosed nor suggested replacing the fibrous mat of Green et al. with insulation with a density of about 0.5 to 7 pounds per foot³, and a thickness of at least about 0.5 inch. To do so would mean joining insulation with a density of about 0.5 to 7 pounds per foot³, and a thickness of at least about 0.5 inch onto the 0.5 inch gypsum board of Green et al. There was no motivation to modify the prior art as suggested by the Examiner. Such a product would

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not be suitable for use as a tile backer. The mat of Green et al. is used on the interior facing surface of the tile backer to provide water proofing. Performing the substitution urged by the Examiner would place at least 0.5 inch of insulation material of 0.5 to 7 pounds per cubic foot density on the interior facing surface of the gypsum board of the tile backer. Insulation material of at least 0.5 inch in the claimed density range lacks the compressive strength and stability that would be needed to be suitable for use as a tile backer. The application of a small force (e.g., a person leaning against the tile wall) could easily compress the insulation material, damaging the tile wall. No person of ordinary skill would even consider employing such a material as a tile backer.

M.P.E.P. § 2143.02 recites:

**THE PROPOSED MODIFICATION CANNOT RENDER THE
PRIOR ART UNSATISFACTORY FOR ITS INTENDED
PURPOSE**

If proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification. *In re Gordon*, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984) ...

**THE PROPOSED MODIFICATION CANNOT CHANGE THE
PRINCIPLE OF OPERATION OF A REFERENCE**

If the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims *prima facie* obvious. *In re Ratti*, 270 F.2d 810, 123 USPQ 349 (CCPA 1959) ([The prior art reference] taught the device required rigidity for operation, whereas the claimed invention required resiliency. The court reversed the rejection holding the "suggested combination of references would require a substantial reconstruction and redesign of the elements shown in [the primary reference] as well as a change in the basic principle under which the [primary reference] construction was designed to operate." 270 F.2d at 813, 123 USPQ at 352.).

The principles of operation of Green et al. are further explained by the enclosed product literature of Georgia Pacific Corporation for DensShield® Tile Backer. The last page of the

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warranty of the DensShield® Tile Backer document lists Green et al. (Pat. 5,397,631) as one of the patents covering the DensShield® Tile Backer product described therein.

Thus, applying the principles of the M.P.E.P., there was no suggestion or motivation to modify the teachings of Green et al. to achieve the invention of amended claims 1 and 29.

The amendment to claims 1 and 29 is supported in the specification at page 7, lines 10-11. No new matter is added.

Regarding claims 39-41, the Examiner alleges that the use of a "a porous web having ... a density of about 1-4 pounds per foot³, and a thickness of about 0.5 to 6 inches" is merely optimization. That is incorrect. The recited ranges make the invention of dependent claims 39-41 a very different type of product that is suitable for different applications than that taught by Green et al. Changing the teachings of a prior art patent so that the prior art is unsatisfactory for its intended purpose and changing the principles of operation of the reference cannot be characterized as "optimization." The same is true for the more dense material of up to 7 pounds per cubic foot now claimed in claims 1 and 29. Thus, the Examiner's allegation that the claimed invention involved only routine skill in the art also fails.

Therefore, claims 1 and 29 should now be patentable.

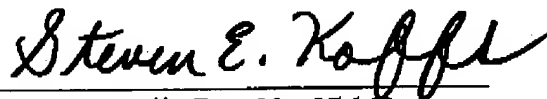
Claims 2-9, 29-39, and 41 variously depend from claim 1 or claim 29, and should all be allowable for at least the same reasons as the independent claims.

In claim 3, "fiberglass" is changed to "fiber glass", because the one-word version of the term is considered a trademark. This change of terminology is not related to any issue of patentability. Also, in claims 3 and 30, the alternative of mineral fibers is added. Support for this amendment is provided at page 8, line 13. No new matter is added.

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In view of the foregoing amendments and remarks, Applicants respectfully submit that this application is now in condition for allowance, and request early notification to that effect.

Respectfully submitted,



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Enclosure: 14 pages



DensShield® Tile Backer



YOUR COMPLETE RESOURCE FOR
INNOVATIVE GYPSUM PRODUCTS

DensShield® Tile Backer

PROTECT WHAT YOU CREATE®

5 Distinctive Reasons to Use DensShield®

1. Resists Moisture and Mold Growth.

DensShield Tile Backer features a built-in water barrier that stops moisture at the surface. (Most backer boards require a vapor barrier to ensure warranty coverage.) This heat cured acrylic coating and moisture-resistant, treated core protect both the tile installation and wall cavity behind it. The patented glass mat construction of DensShield provides a high level of mold resistance.*

2. Light weight.

DensShield is 17 to 32 lbs. lighter per panel than cement board, depending on panel size.

3. Handles easily.

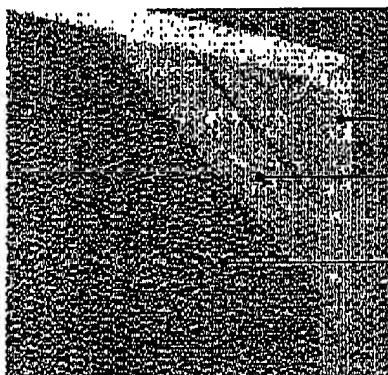
You don't need special tools or power saws to cut DensShield. Cutouts — including special rounded cuts — are simple and easy with a standard utility knife rather than expensive tools used for cement board.

4. Finishes smoothly and cleanly.

Just a simple utility knife makes smooth, clean cutouts — no ragged edges or gritty mess that can scratch fixtures like cement board residue. Can be fastened close to the edge without compromising its integrity. Aligns perfectly with studs and other gypsum board products. Detailed installation instructions on every panel.

5. Lifetime Limited Warranty on entire tile installation.

Georgia-Pacific's industry-first Lifetime Limited Warranty on any properly applied tile installation over DensShield is made possible by the board's unique patented design that protects both the tile installation and wall cavity from moisture. For complete terms, conditions and limitations, call the Georgia-Pacific Gypsum Technical Hotline at 1-800-225-6119.



Patented product with treated, water-resistant core

Glass mats on front and back add strength. No paper to delaminate or serve as food for mold.

Grey, heat-cured acrylic coating protects the tile installation and wall cavity from moisture intrusion and damage. The only tile backer in the industry with a built-in water barrier.

*When tested as manufactured per ASTM D 3273.

2 Technical Service Hotline 1.800.225.6119 or www.gpgypsum.com

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Quality Behind Your Tile: Fast and Easy Installation

Unlike heavy, hard-to-install cement board, DensShield installs like regular wallboard but outperforms both cement board and greenboard. The result is a 46% savings in labor and installation costs over cement board according to a study by the NAHB Research Institute. Costly call-backs often associated with use of paper-faced greenboard also can be eliminated while providing the assurance of a Lifetime Limited Warranty on tile installations properly applied over DensShield.

DensShield Meets a Higher Performance Standard

DensShield's unique, heat-cured acrylic coating completely stops the passage of water, keeping it out of the wall cavity. This coating, combined with a treated core and glass mat construction on front and back, makes DensShield a superior product for protecting both the tile installation and the wall cavity behind it.

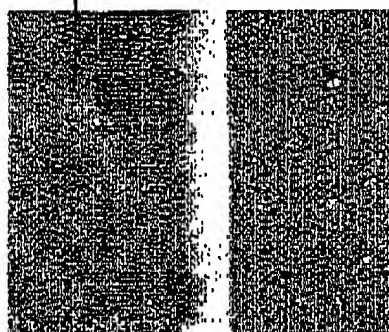


Georgia-Pacific

DensShield® Tile Backer

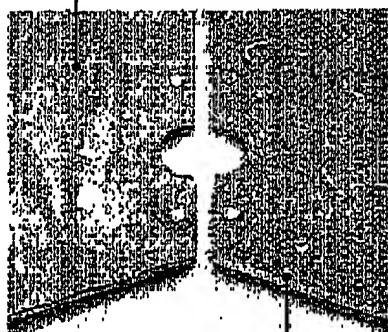
DensShield	Cement Board	Fiber Cement Board	Greenboard
Stops moisture at the surface	Transmits moisture readily	Absorbs moisture readily	Not recommended for high moisture areas.
Built-in water barrier; requires no further protection to ensure warranty coverage	Requires additional vapor barrier to ensure warranty coverage	Requires additional vapor barrier to ensure warranty coverage	
Weighs 64 lbs. per 1/2" 4 x 8 panel	Weighs about 96 lbs. per 1/2" 4 x 8 panel	Weighs about 90 lbs. per 1/2" 4 x 8 panel	
Cuts easily, cleanly with utility knife	Difficult to cut with utility knife; creates dust; usually cut with power saw	Difficult to cut with utility knife; creates dust; usually cut with power saw	
No special tools needed for installation	Requires special tools to cut and install	Requires special tools to cut and install	
Edges are smooth and straight	Has rough, uneven edges	Has rough, uneven edges	
More standard sizes to require fewer cuts	Sizes require cuts that create job site waste	Sizes require cuts that create job site waste	
Strong in both directions for easy handling	Breaks apart if not handled properly	Breaks apart if not handled properly	

Cement Board
(Heavy, hard to cut and handle)



DensShield Tile Guard
(Light weight, easy to cut and handle)

Greenboard
(Easily damaged by water and moisture)



DensShield Tile Guard
(Built-in water barrier stops moisture intrusion and protects tile installation.)

Tub/Shower Walls or Ceilings

DS001 Walls or Ceilings

DensShield can be used as a tile substrate in residential and commercial wall applications. Attach DensShield with grey side facing the interior. Tiles should always be applied to grey side. Cut panel to required size and make cutouts. Fit ends and edges closely. Do not leave gaps between panels.

DensShield may be cut by using a utility knife to score, then snap, working from the grey face side.

- For walls, 20-gauge steel or wood framing should be spaced no greater than 16" o.c. for 1/2" DensShield or 24" o.c. for 5/8" DensShield. Board can be applied horizontally or vertically.
- For ceilings, framing should be spaced no greater than 12" o.c. for 1/2" thickness or 16" o.c. for 5/8" thickness. Board should be applied perpendicular to framing.
- Fasteners shall be spaced 6" o.c. for walls and ceilings for wood and metal framing. Do not countersink. Drive fasteners flush with grey coated surface. Nails: galvanized roofing nails 1 1/2" for 1/2" DensShield, 1 3/4" for 5/8" DensShield. Screws: corrosion-resistant minimum 1 1/2" bugle head

Properties	1/4" DensShield	1/2" DensShield	5/8" DensShield
Width, standard	4'	4', 32'	4'
Length, standard	4'	5', 8'	8'
Edges	square	square	square
Weight, lbs./sq. ft., nominal	1.2	2.0	2.5
Bending Radius	8'	12'	16'
Fire Classification	n/a	1- and 2-hour assemblies	Type X, UL classified
Standards	ASTM C 1178	ASTM C 1178	ASTM C 1178
Code Evaluation	NY MEA 65-88-M, ICC-ES Legacy Report 572		
TCA Recognition	ASTM C 627 (Robinson Floor Test); Floors - F146; Walls - W245; Ceilings - C311 and C312; Tubs - B419; Showers - B420		

Perfect Product For:

- Indoor Pool Walls and Ceilings
- Atriums
- Laboratories
- Processing Plants

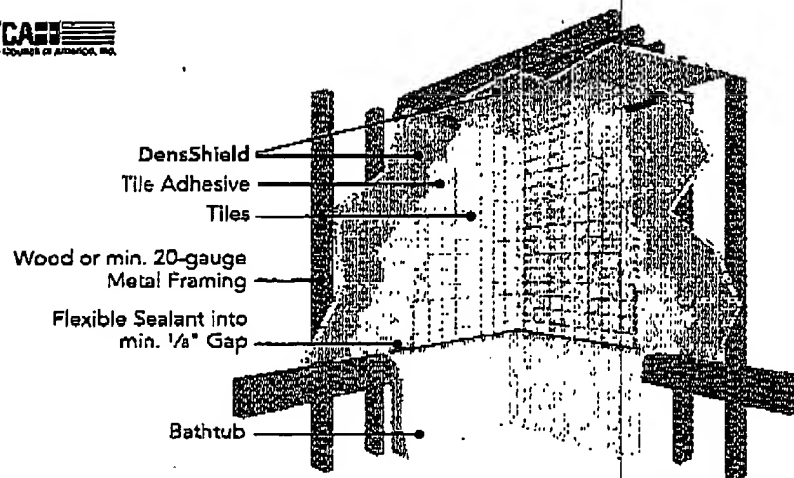


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DensShield® Tile Backer

drywall screws for $\frac{1}{2}$ " DensShield, and $1\frac{3}{8}$ " bugle head drywall screws for $\frac{3}{8}$ " DensShield.

- Do not use additional vapor barrier. DensShield has a built-in moisture barrier.
- Use self-adhesive 2" wide 10 x 10 glass fiber mesh tape. Bed tape on all joints and corners with material used to set tiles. Caulk or seal penetrations and abutments to dissimilar materials.
- Tile applications unsupported by ties or the floor shall have a maximum weight of 4 lbs./sq.ft. For larger tiles (in excess of 14" x 14"), consult tile manufacturer for wall deflection requirements.
- In areas outside the shower where DensShield meets gypsum board:
 - (1) If the tiles fall over the



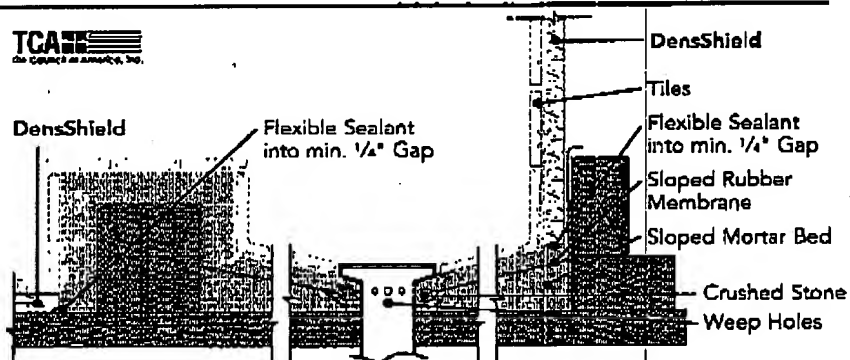
DensShield-to-gypsum board joint, apply 2" wide 10 x 10 glass mesh tape and skim with tile setting material (Type I mastic or latex modified thin-set). (2) If the tiles stop before the DensShield-to-gypsum board joint, apply 2"

wide 10 x 10 glass mesh tape and skim with setting type joint compound to achieve a smooth and paintable surface.

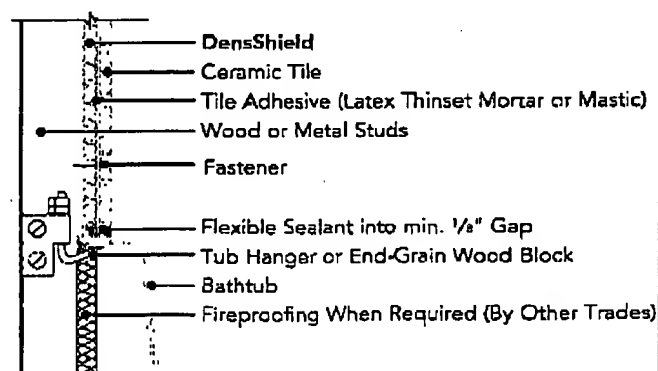
- Do not use all-purpose joint compound or paper tape in wet areas.

DS002 Shower Pan

- Install DensShield on walls according to assembly DS001.
- Shower pan or rubber membrane must be adequately sloped to the open drain or weep-hole detail to permit proper water drainage. Do not install DensShield in the shower pan or use it as a shower base.
- For showers with curbs, apply waterproof membrane up walls minimum 2" and maximum 4" above curb.
- For showers without curbs, apply waterproof membrane up walls minimum 6" and maximum 8".
- Wood or other satisfactory blocking should be applied at the bottom framing to support the vertical sides of the shower pan or membrane and DensShield.
- Do not place DensShield into shower pan mortar bed. Leave minimum $\frac{1}{4}$ " gap and fill with 100% silicone caulk.

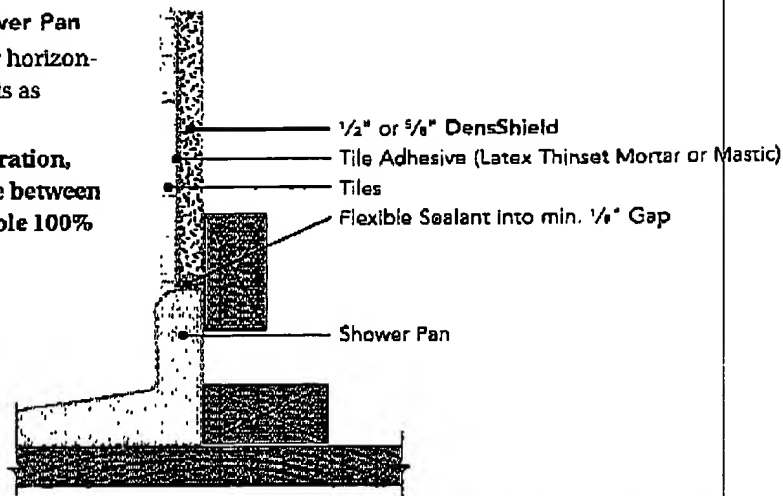
**DS003 Bathtub or Shower Receptor**

- Apply DensShield either horizontally or vertically on walls as shown in DS001.
- To prevent water penetration, completely fill the space between tile and tub with a flexible 100% silicone sealant.

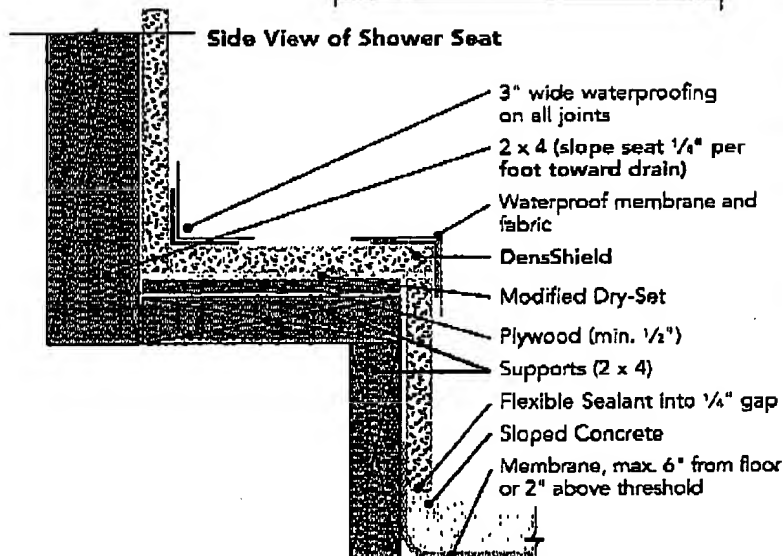
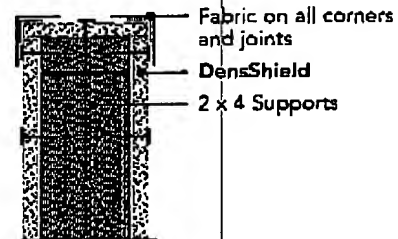


DS004 Pre-Formed Shower Pan

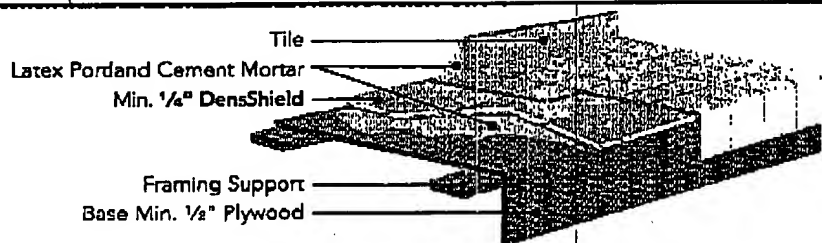
- Apply DensShield either horizontally or vertically on walls as shown in DS001.
- To prevent water penetration, completely fill the space between tile and tub with a flexible 100% silicone sealant.



DensShield® Tile Backer

TCA
The Council of America, Inc.
**Knee Wall Details****Countertops****DS006**

- Plywood must be installed flat and level.
- Framing spacing should not exceed 24" o.c.
- Install minimum 1/2" exposure 1 plywood on top of supports.
- Provide support on overhangs on cantilever counters to prevent movement.
- Apply leveling bed of latex portland cement mortar to plywood using 1/4" x 1/4" x 1/2" notched trowel.



- Apply clean, dry DensShield to base (grey acrylic coated side up), fastening every 6" to 8" o.c. in both directions into substrate while leveling bed is still fluid. Use either 1 1/4" galvanized roofing nails or 1 1/4" rust-resistant drywall screws.
- Stagger joints of DensShield panels with those of the plywood base.

- Butt DensShield joints tightly. Tape all joints and corners using 2"-wide self-adhering fiberglass mesh tape. Embed tape with latex portland cement mortar that meets ANSI A118.4.
- Install tile, expansion and control joints and grout in accordance with ANSI A108. Use latex portland cement mortar to set tile.

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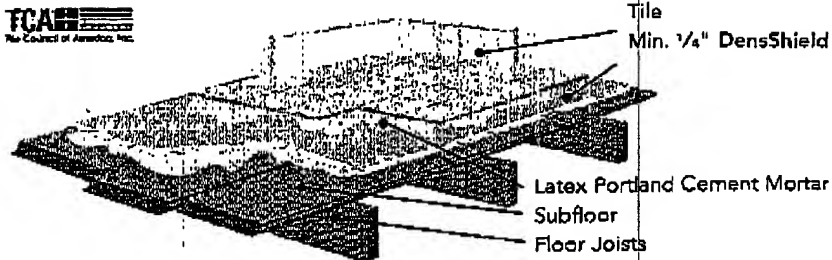
DensShield® Tile Backer

Residential and Light Commercial Floors

DS005

$\frac{1}{4}$ " and $\frac{1}{2}$ " DensShield can be used as a tile substrate in floor tile applications as defined in the *Handbook for Ceramic Tile Installation*, published by the Tile Council of America.

- Laminate DensShield panels, grey coated side up, to subfloor using a latex portland cement mortar liberally applied with minimum $\frac{1}{4}$ " x $\frac{1}{4}$ " x $\frac{1}{4}$ " square-tooth notched trowel. Embed DensShield into mortar while still pliant (do not exceed open time). Stagger DensShield joints so as not to align with subfloor joints. Butt panels tightly to each other. Leave no gaps between panels.
- Fasten panels to subfloor with $1\frac{1}{4}$ " galvanized roofing nails or corrosion-resistant screws. Begin fastening in the center of each panel, working your way to the edges. Avoid nailing into floor joists on new construction to prevent nail pops. Space fasteners no greater than 8" o.c. in both directions. Drive fasteners flush with the acrylic surface. Do not countersink.
- If moisture is a concern, apply 2" wide 10 x 10 glass mesh tape over joints. Embed tape with setting material.
- Apply flooring-grade tile with latex portland cement mortar. Full-thickness thresholds should be used and butted against the DensShield panels, flush with the tile surface. Use a 2" x 2" or larger floor-grade tile.
- Use either standard floor grout (ANSI A118.6) or polymer modified grout (ANSI A118.7).
- DensShield is not to be used in conjunction with heated floor



- systems that exceed 120° continuous temperature.
- DensShield can be used on curbs when trowel-on waterproof membrane is used.
- DensShield is not for exterior use.
- Do not use Type I organic mastics for floor applications.

Requirements:

- Design floor areas over which tile is to be applied to have a deflection not greater than $L/360$ of the span when measured under 300 lb. concentrated load (see ASTM C 627).
- Maximum variation in the subfloor surface shall not exceed $\frac{1}{2}$ " in 10'-0" from the required plane.
- Use latex portland cement mortar to set tile.
- Fasten DensShield into subfloor with galvanized roofing nails or corrosion-resistant screws.
- Keep DensShield surfaces clean and free of dirt, dust or oily film.
- Set tiles on grey acrylic coating.

Materials:

- Coated glass mat backer board - ASTM C 1178
- Latex portland cement mortar - ANSI A118.4.
- Polymer modified tile grout - ANSI A118.7.

Installation Specifications:

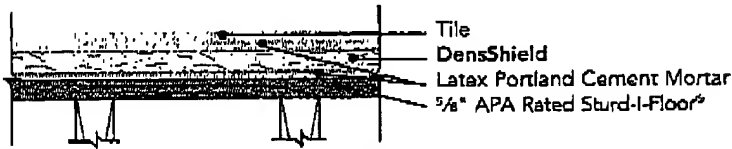
- Coated glass mat backer board in accordance with manufacturer's literature.
- Tile - ANSI A 108.5.
- Grout - ANSI 108.10.

Minimum Subfloor Thickness	Minimum Joist Spacing
$\frac{5}{8}$ " Plywood Sturd-I-Floor™	16" o.c. joists
$\frac{3}{4}$ " Plywood Sturd-I-Floor™	19.2" o.c. engineered lumber
$\frac{1}{2}$ " APA Rated Sturd-I-Floor®	24" o.c. engineered lumber

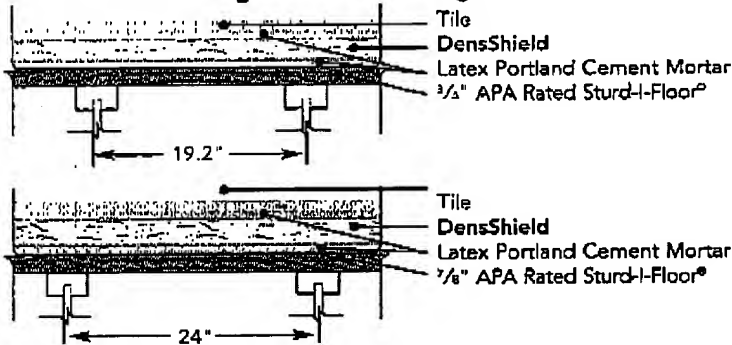
® $\frac{3}{4}$ " OSB is acceptable

DensShield® Tile Backer

DensShield Over Conventional Joist (Exterior-glove Subfloor)



DensShield Over Engineered Joist (Tongue-and-Groove Subfloor)

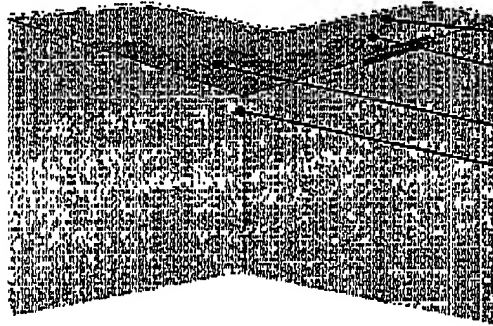


The application of thin-set over subfloor provides a leveling bed between the subfloor and the back of DensShield. If this step is not completed, air gaps can cause movement and crack the grout lines. (This step is common with all other backer board products.)

Non-Tile Walls or Ceilings

DS010 Dry Non-tile, Non-Wet Areas

This installation should be used in interior non-tile areas that do not come in contact with water and may experience intermittent exposure to high levels of humidity for short and infrequent periods of time, such as outside of tub and shower areas in residential construction. For walls, steel (25-gauge min.) or wood framing should be spaced no greater than 16" o.c. for 1/2" DensShield or 24" o.c. for 5/8" DensShield. For ceilings, board should be spaced no greater than 12" o.c. for 1/2" thickness or 16" o.c. for 5/8" thickness.



Setting-Type Joint Compound

Apply 2" 10 x 10 glass mesh tape over joints and angles. Embed tape in setting compound. Trowel (skim-coat) setting compound over entire DensShield panel to produce a smooth surface. Prior to painting or papering, the surface should always be primed with a primer suitable for high-moisture areas, as recommended by the

paint or wallpaper manufacturer for applications over setting-type joint compound. Do not use ready-mix or sandable setting-type joint compounds in this type of application.

DensShield® Tile Backer

High-Humidity Non-Tile Areas

DS011

For areas exposed to continuous, higher-than-normal moisture levels, such as those found in enclosed swimming pools, garden areas, therapy rooms, locker rooms, laboratory white rooms, operating rooms, commercial and institutional kitchens, etc., finish DensShield with materials that are highly water-resistant and form a vapor barrier in conjunction with DensShield of less than 0.5

Residential Steam Rooms

DS013

DensShield can be used in residential steam rooms with a maximum floor areas size of 48 sq. ft. For information on larger areas, call the G-P Technical Hotline at 1-800-225-6119. For walls, steel or wood framing should be spaced no greater than 16" o.c. for 1/2" DensShield or 24" o.c. for 3/8" DensShield. For ceilings, board should be spaced no greater than 12" o.c. for 1/2" thickness or 16" o.c. for 3/8" thickness.

- Apply DensShield to steam room wall and ceiling surfaces using corrosion-resistant nails or screws 6" o.c. along all framing members. All parts of the steam room shall be tiled. *Caution: Exposing untiled areas such as wallpaper, joint compound, drywall or untiled DensShield may result in unsatisfactory performance of these materials.*
- Tape all corners and joints with a self-adhering glass mesh tape and embed with a latex modified dry-set (thin-set) mortar. Spot fasteners that were incidentally countersunk and other surface deformations. As an alternative, corners and joints may be finished with a liquid membrane manufacturer's taping procedures. See manufacturer's directions.

perms. For walls, steel or wood framing should be spaced no greater than 16" o.c. for 1/2" DensShield or 24" o.c. for 3/8" DensShield. For ceilings, board should be spaced no greater than 12" o.c. for 1/2" thickness or 16" o.c. for 3/8" thickness. See Sto Corporation Specification No. F-477; Dryvit Systems Inc. Specification No. DS 174; or other manufacturers' highly water-resistant equivalents.

Note: A finishing method must never be used in a more severe environment than described.

- Seal around all penetrations and where DensShield meets dissimilar materials with a flexible silicone sealant.
- Roller apply a liquid waterproofing material approved for steam room applications directly over the entire DensShield surface, covering all fasteners, corners and joints.
- Apply tile with a modified thin-set mortar per manufacturer's recommendations.
- Use flexible silicone caulk as grout in all corners.
- Use unfaced fiberglass insulation in wall cavity to retard heat transmission.
- Do not install a vapor barrier behind DensShield.

Operation and Maintenance

The steam generation unit should be timer-controlled to avoid incidental lengthy exposure. Maintenance of grout and caulking of corners due to movement should be performed when required.

Finishing Materials Manufacturers

Product*	Supplier
Genesis® DM; DS 174	Dryvit® Systems (1.800.556.7752)
Sto Flexyl®, Sto Primer	Sto Corp. (1.800.221.2397)
ParFlex®	Parflex (1.800.537.2739)
DeGussa Wall Systems	(1.800.221.9255)
Dura Clad® Epoxy Paint	Duron® Paints and Wallcoverings (1.800.723.8766)
Laticrete 9235	Laticrete (1.800.243-4788)

*Products may be substituted with equivalent products. Manufacturer must provide equivalency.

Wet Non-Tile Areas

DS012

For wet, non-tile areas, steel or wood framing should be spaced no greater than 16" o.c. for 1/2" DensShield or 24" o.c. for 3/8" DensShield. For ceilings, board should be spaced no greater than 12" o.c. for 1/2" thickness or 16" o.c. for 3/8" thickness.

- In non-tile areas exposed to water or water condensation for prolonged periods, such as gang showers, processing plants, clean rooms and laboratories, apply a 6" wide strip of Sto Reinforcing Fiber Mesh or equivalent to angles and embed with Sto Flexyl® Ground Coat or equivalent.
- Skim coat the entire surface with Sto Flexyl to achieve a flat and uniform surface. Prime with Sto Primer. *Note: Results in a fine sanded texture.*
- Apply two coats of Duron® Dura Clad® two-part water-reducible epoxy paint or equal at the rate of about 300 square feet per gallon for each coat.
- In all steps, apply finishing materials according to manufacturers' instructions.

Any installation recommendations of other manufacturers using DensShield as a component must be in accordance with the installation instructions contained in this brochure. Direct questions to the G-P Gypsum Technical Hotline at 1-800-225-6119. Or visit our Web site at www.gpgypsum.com. Georgia-Pacific Corporation is not responsible or liable for improper DensShield application.

Fire-Rated Assemblies

DensShield® Tile Backer

DensShield Fireguard Type X: The Ultimate Choice
 The only tile substrate to specify where a fire rating and moisture protection are necessary.
 The only high performance tile substrate that protects and insulates in wall areas while achieving a 1-hour fire rating.
 Meets Type X requirements.
 Tile is not required to achieve a 1- or 2-hour fire rating.
 Aligns perfectly with 1/2" Type X gypsum board and is UL Classified.

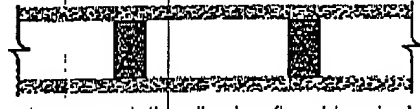
1-Hour Fire Rating

Test Reference: WHI 495-0853
 UL U305

30-34 STC Sound Trans.

Test Reference: OR 64-8
 Partition Thickness: 4 1/4"
 Weight per Sq. Ft.: 7.0

3/4" DensShield Fireguard (Type X) tile backer applied parallel or at right angles to 2 x 4 wood studs 16" o.c. with 1 1/8" phosphate coated nails 8" o.c. Joints staggered each side and covered with 2" wide 10 x 10 glass mesh tape and tile adhesive. (Load-bearing)



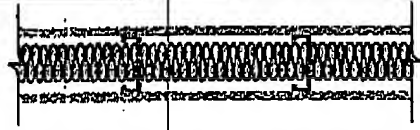
1-Hour Fire Rating

Test Reference: CTC 1897-1655

45-49 STC Sound Trans.

Test Reference: Based on RAL
 TL69-42
 Partition Thickness: 3 1/2"
 Weight per Sq. Ft.: 5.0

1/2" DensShield tile backer applied parallel to each side of 2 1/2" metal studs 16" o.c. with 1" Type S screws 8" o.c. at edge joints and 12" o.c. at perimeter and intermediate studs. Cavity filled with 3 1/2", 0.526 pcf, glass fiber batts friction fit in stud space. Joints covered with 2" wide 10 x 10 glass mesh tape and tile adhesive.



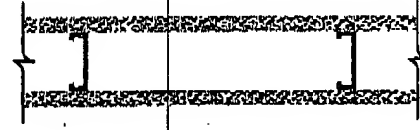
1-Hour Fire Rating

Test Reference: CTC 2171-3996

49 STC Sound Trans.

Test Reference: RAL-TL00-125
 Partition Thickness: 4 5/8"
 Weight per Sq. Ft.: 6.0

3/4" DensShield Fireguard (Type X) applied parallel or at right angles to each side of 3 1/4" metal studs 24" o.c. with 1 1/4" Type S drywall screws 8" o.c. to vertical studs and 12" o.c. to perimeter track. Stagger joints each side. Sound tested with 2 1/2" glass fiber batt insulation, friction fit.

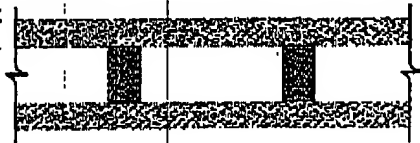


2-Hour Fire Rating

Test Reference: UL U301
 Partition Thickness: 6"
 Weight per Sq. Ft.: 13.8

Base Layer: 3/4" DensArmor Plus Fireguard C or 3/4" ToughRock Fireguard C gypsum board. Base layer attached horizontally or vertically to studs with 1 1/2" nails spaced 16" o.c.

Face Layer: 3/4" DensShield Fireguard (Type X) tile backer applied horizontally or vertically. Face layer attached to studs over base layer with 2 3/4" nails spaced 8" o.c. Vertical joints located over studs. All joints in face layers staggered with joints in base layers. Joints of each base layer offset with joints of base layer on opposite side. (Load-bearing)



2-Hour Fire Rating

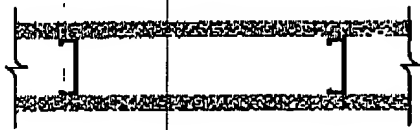
Test Reference: CTC 1894-1530

54 STC Sound Trans.

Test Reference: Est.
 Partition Thickness: 4 1/2"
 Weight per Sq. Ft.: 8.0

Base Layer: 1/2" DensArmor Plus Fireguard C or 1/2" ToughRock Fireguard C gypsum board applied parallel to each side of 2 1/2" metal studs 24" o.c. with 1" Type S screws 24" o.c.

Face Layer: 1/2" DensShield tile backer applied parallel to each side of studs with 1 3/4" Type S screws 8" o.c. at edge joints, 12" o.c. at perimeter and intermediate studs. Stagger joints 24" o.c. each layer and side. Joints covered with 2" wide 10" x 10" glass mesh tape and tile adhesive. Sound tested with 2 1/2" glass fiber batt insulation, friction fit.



2-Hour Fire Rating

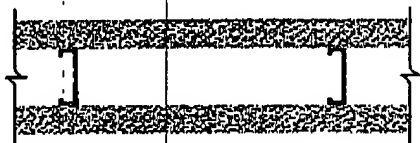
Test Reference: UL U411

57 STC Sound Trans.

Test Reference: RAL-TL00-122
 Partition Thickness: 6 1/4"
 Weight per Sq. Ft.: 9.0

Base Layer: 3/4" DensArmor Plus Fireguard or 3/4" ToughRock Fireguard C gypsum board applied parallel to each side of 2 1/2" metal studs 24" o.c. with 1" Type S screws 16" o.c.

Face Layer: 3/4" DensShield Fireguard (Type X) tile backer applied parallel to each side of studs with 1 3/4" Type S screws 16" o.c. at edge joints, 12" o.c. at perimeter and intermediate studs. Stagger joints 24" o.c. each layer and side. Sound tested with 2 1/2" glass fiber batt insulation, friction fit.



Georgia-Pacific

Technical Service Hotline 1.800.225.6119 or www.gpgypsum.com 9

DensShield® Tile Backer

Testing and Code Recognition

Robinson Floor Test/ASTM C 627

DensShield passed the industry standard test conducted by the Tile Council of America.

Adhesion Bond Testing

CTC-Geotek conducted tests comparing adhesion capabilities using most major manufacturers' setting materials. The tests concluded that bonds with DensShield are as good, if not better, than bonds with cement board.

Moisture Wick Testing

The Ceramic Tile Institute wicking test CTI-T83 procedures showed that within a 24-hour period, cement board will "wick" at least 3" up the board while DensShield will wick less than one-third of 1" (.31") during that same period.

Shower Test

In a remarkable test by an independent testing firm, DensShield was subjected to a shower of water at 110°F, 15 minutes per hour for 24 hours, five days per week for one-year. The installation had *no grout* between wall and ceiling tiles. No deterioration occurred. Water-resistant green board was tested under the same conditions and failed after only 10 days. A similar test was conducted using cement board at CTC-Geotek. DensShield *outperformed* cement board. Test results are available upon request.

The DensShield test compares to 28 years of showers without deterioration. Although cementitious backer boards would not likely deteriorate under the same conditions, the possibility exists for deterioration of framing members and wall cavity due to water infiltration if a water barrier isn't positioned behind the cementitious backer unit.

Percolation Test

The International Conference of Building Officials - Evaluation Service (ICBO-ES) percolation test measures how much water will pass through a panel within 48 hours. The test determines if an additional water barrier should be installed. The test consists of a 2" diameter tube, 48" long, bonded to test samples with silicone sealant. The tube is filled with water and after the allotted time, the remaining water is measured (minus evaporation).

1/8" of water passed through DensShield, 19" + of water passed through one cementitious tile substrate sample and 43" + of water passed through another sample of cement board. The test shows that DensShield stops water at the surface, while cement boards allow water to pass through their porous construction.

Mold Resistance Test

DensShield features a built-in water barrier that stops moisture at the surface. (All other backer boards require a vapor barrier to ensure warranty coverage.) The patented glass mat construction of DensShield achieved a score indicating "no mold growth" when tested, as manufactured, per ASTM D 3273 by an independent testing service.

Standards and Code Compliance

DensShield in 1/4", 1/2" and 5/8" thicknesses meets ASTM C 1178 as a glass mat gypsum substrate for use as tile backer. DensShield has the following evaluation reports:

- ICC-ES Legacy Report 572
- New York City MEA 65-88-M

DensShield installation information is listed in the current Tile Council of America (TCA) Handbook for Ceramic Tile Installation.

Architectural Specifications

Part 1 - General

1.0 Description

A. Work in this section includes, but is not limited to:

1. Backer board for ceramic tile and untiled installation on walls and ceilings.
2. Underlayment for ceramic tile installation on indoor floors.
3. Substrate for ceramic tile installation on countertops.

B. Related work specified elsewhere:

1. Rough carpentry.
2. Finish carpentry.
3. Ceramic tile.
4. Tile adhesive.
5. Grout.
6. Painting.

1.1 Submittals

A. *Product data:* Submit manufacturer's descriptive literature indicating material composition, thickness, sizes and fire resistance and that product meets specified requirements.

1.2 Quality assurance

A. *Fire-resistance ratings:* Where applicable, provide materials and construction that are identical to those of assemblies whose fire-resistance ratings are indicated.

1.3 Delivery, Storage and Handling

A. *Delivery:* Deliver materials to the job site in manufacturer's original packaging, containers and bundles with manufacturer's brand name and identification intact and legible.

B. *Storage and handling:* Store and handle materials to protect against contact with damp and wet surfaces, exposure to weather, breakage and damage to edges. Provide air circulation under covering and around stacks of materials.

1.4 Limitations

- A. Apply tile only to gray side of DensShield panels.
- B. Do not use DensShield where there is prolonged exposure to temperatures exceeding 125°F.
- C. Do not use DensShield where there is continuous exposure to extreme conditions, e.g., saunas, commercial steam rooms and radiant barriers at fireplaces.
- D. Do not install vapor retarders directly behind DensShield panels.
- E. Do not use DensShield in conjunction with passive solar heat systems.
- F. Do not use DensShield panels as a base for nailing and mechanical fastening.
- G. Do not use DensShield in floor tile installation using tile having less than 2" x 2" face dimensions.
- H. A subfloor of Exposure-1 APA-rated plywood floor panels with a thickness of 5/8" is recommended. But Exposure-1 APA-rated OSB floor panels having a thickness of 3/4" are acceptable. The subfloor should be applied over joists spaced 16" o.c. or engineered lumber spaced 19.2" o.c. maximum with an

DensShield® Tile Backer

L/360 deflection limitation for the span, including live and dead loads. Joists can be spaced 24" o.c. maximum when using 7/16" tongue-and-groove plywood subfloor (L/360 deflection limitation).

- I. Do not apply DensShield directly to concrete or masonry block. Framing or furring of wall is necessary.
- J. Not for exterior use.
- K. Do not use Type I organic mastics for floor applications. DensShield should not be used as a backer for resilient flooring.
- L. Do not place DensShield into shower pan mortar bed. Leave minimum 1/8" gap and fill with 100% silicone caulk.
- M. Do not use wallboard joint compound or paper tape in wet areas.
- N. Do not install DensShield on shower floors.

Part 2 - Products

2.1 Tile backer

A. Acceptable products:

1. Georgia-Pacific Corporation, 1/4" or 1/2" DensShield.
2. Georgia-Pacific Corporation, 1/4" DensShield Fireguard Type X.

B. Characteristics:

1. Size:
 - a. 1/4" DensShield: 4' x 4'.
 - b. 1/4" DensShield: 32" x 5', 4' x 5' and 4' x 8'.
 - c. 1/2" DensShield Fireguard Type X: 4' x 8'.
2. Composition: Water-resistant treated core with glass mat moisture protective coating and glass mats, both sides. The face side is surfaced with heat-cured copolymer water-resistant coating.
3. Fire resistance, 1/2" DensShield Fireguard Type X: Type X when tested in accordance with ASTM E 119, UL classified.

C. Standards: ASTM C 1178

2.2 Accessories

- A. Trim: Sheet steel, galvanized.
- B. Wood framing fasteners: Nails: 11-gauge galvanized nails with 7/16" head, hot dipped. Screws: Type W or Type S, Hi-Lo, bugle head, rust resistant.
- C. Metal framing fasteners: Screws: Light-gauge metal framing - Type S, bugle or wafer head, self-tapping, rust resistant. Heavy-gauge metal framing - Type S-12, bugle or wafer head, rust resistant.

2.3 Joint treatment materials

A. Joint tape:

1. 2" wide 10 x 10 glass mesh tape.
2. Reinforcing fabric: Balanced, alkali-resistant, open-weave, glass fiber fabric, made from continuous multi-end strands with tensile strength of not less than 120 lbs. and 140 lbs. in warp and fill directions, respectively, per ASTM D 1682 and complying with ASTM D 578, and of 4.30 oz./sq. yd. minimum weight.

B. Setting-type joint compound: Untitled, non-wet areas: ToughRock setting compounds.

C. Tile setting material: Mastic or mortars, organic adhesive ANSI A136.1, dry set ANSI A118.1, latex portland cement mortar ANSI A118.4.

2.4 High-humidity and wet-area untitled finish system materials

A. Acceptable manufacturers: Dryvit Systems: Genesis® DM, DS174 or comparable. Sto Industries: F-477, Flexyl® or comparable. Parex: ParFlex® or comparable. Synergy: Xtra-Stop® or comparable.

B. Ground coat: Job-mixed formulation of portland cement complying with ASTM C 150, Type I, white or natural color, and system manufacturer's standard polymer-based adhesive designed for use indicated.

C. Primer: System manufacturer's standard primer.

D. Finish coat for high-humidity areas: System manufacturer's standard mixture, factory-mixed formulation of polymer emulsion admixture, colorfast mineral pigments, ground stone particles and fillers.

E. Finish coat for wet areas: Water-reducible epoxy coating system specified for wet areas.

Part 3 - Execution

3.0 General

- A. Provide DensShield where indicated on drawings using fastening systems specified.
- B. Use maximum lengths possible to minimize number of joints. Stagger end joints and edge joints. Attach DensShield panels to framing with fasteners recommended by tile backer manufacturer, spaced 6" o.c. Butt ends and edges.
- C. Locate control and expansion joints at same locations as substrate and where required by finishes. Expansion joints for tile and non-tile applications: Walls - Expansion joints not to exceed every 30 lineal feet of continuous wall or as specified by designing authority. Ceilings - Not to exceed every 30 feet of continuous ceiling surface without perimeter relief or a maximum of 900 sq. ft., not to exceed every 50 feet of continuous ceiling surface with perimeter relief or a maximum of 2,500 sq. ft., or as specified by designing authority.

3.1 Tile backer

A. Wall and ceiling installations:

1. On walls, install DensShield panels vertically or horizontally.
2. On ceilings, install DensShield perpendicular to framing.
3. Install tile backer in accordance with manufacturer's recommendations and TCA Handbook for Ceramic Tile Installation, Method W245 and C311.

B. Residential and light commercial floors: Install DensShield panels in accordance with manufacturer's recommendations

as applicable in TCA Handbook for Ceramic Tile Installation, Method F146.

C. Countertops: Install DensShield in accordance with manufacturer's recommendations and TCA Handbook for Ceramic Tile Installation, Method C513.

D. Bathtubs: Install DensShield in accordance with manufacturer's recommendations and TCA Handbook for Ceramic Tile Installation, Methods W245 and B419.

F. Showers: Install DensShield in accordance with manufacturer's recommendations and TCA Handbook for Ceramic Tile Installation, Methods W245 and B420 for thin-set installation and mastic installation.

G. Finishing:

1. Substrate for tile: Apply glass mesh joint tape over joints. Embed tape in setting material indicated for specified tile finishes. Allow joints to dry prior to installing tile systems.
2. Substrate for paint and wall coverings, dry areas (untitled): Apply glass mesh joint tape over joints. Embed tape in setting-type joint compound specified. Apply skim coat of setting-type joint compound over surface of tile backer for smooth finish.
3. Substrate for high-humidity finish systems (untitled): Apply 6" wide reinforcing fabric over joints. Embed fabric in ground coat. Skim-coat tile backer surface with ground coat for smooth finish. Apply in accordance with finish coat manufacturer's instructions.
4. Substrate for wet area, water reducible epoxy coating finish (untitled): Apply 6" wide reinforcing fabric over joints. Embed fabric in ground coat. Skim-coat with ground coat and compatible primer. Apply epoxy coatings specified as finishing step with epoxy coating system specified.

3.2 Accessories

Install accessories where indicated and in accordance with tile backer manufacturer's instructions.

Caution: THIS PRODUCT CONTAINS CONTINUOUS FILAMENT FIBERGLASS Fiber released during normal handling of this product can cause skin, eye and respiratory irritation. Avoid breathing dust and contact with skin and eyes. Follow these standard work practices:

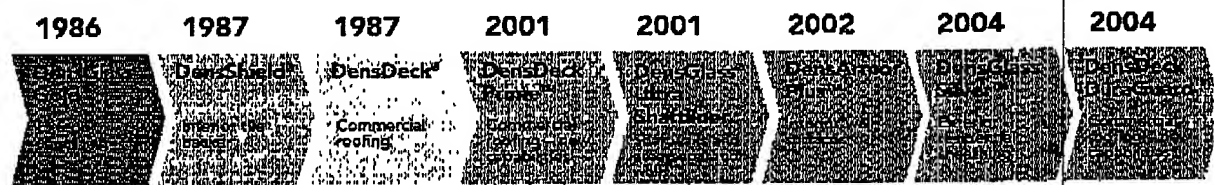
- Wear long-sleeved, loose-fitting clothing, gloves and eye protection.
- Use an approved respirator.
- Wash exposed areas with soap and warm water after handling.
- Wash work clothes separately from other clothing; rinse washer thoroughly. Operations which generate high airborne fiber concentrations (over 10 fibers/cc) require additional respiratory protection.



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Dens™ Technology from G-P Gypsum

G-P Gypsum became the first company to manufacture paperless, glass mat gypsum board with the introduction of DensGlass Gold® exterior sheathing in 1986. Since then, the company has developed a series of patented, paperless, moisture- and mold-resistant glass mat products utilizing a proprietary, breakthrough manufacturing process called Dens™ Technology. Dens Technology allows G-P Gypsum to bring unprecedented, innovative solutions to the building products industry that address previously unmet construction needs. In 2002, G-P Gypsum made history with the introduction of the industry's first moisture- and mold-resistant interior wallboard, DensArmor™ Plus Interior Panels. Today, G-P Gypsum is the only manufacturer producing paperless, moisture- and mold-resistant gypsum products for a variety of residential and commercial building solutions, including interior wallboard, exterior sheathing, tile backer, floor underlayment, roof underlayment and cover boards and shaftliners. For more information, visit www.gpgypsum.com.



The DensShield® Lifetime Limited Tile Installation Warranty

Georgia-Pacific Corporation ("G-P") warrants to the initial homeowner/consumer ("Owner") of DensShield® Tile Backer installed in the Owner's dwelling, that, subject to the conditions and limitations specified below, DensShield (1) will be free of manufacturing defects that make it unsuitable for its intended use; (2) will not crack, chip or delaminate; and (3) will not decay as a result of exposure to moisture, and (4) that when DensShield has been used as a tile substrate, the integrity of the tile installation will remain intact, provided the tile is installed according to Georgia-Pacific installation instructions which are consistent with tile industry standards. This warranty is for life of the Owner and is non-transferable.

Georgia-Pacific also offers a 20-year limited warranty on commercial applications.

For complete warranty details, visit www.gpgypsum.com or call 1-800-225-6119.

www.gpgypsum.com

Technical Hotline: 1-800-225-6119 (M-F, 8-6ET)

Literature Requests: 1-800-BUILD GP



Georgia-Pacific

Sales Information and Order Placement:

USA

Midwest: 1.800.876.4746

South: 1.800.327.2344

Northeast: 1.800.947.4497

West: 1.800.824.7503

CANADA 1.800.387.6823

Quebec: 1.800.361.0486

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DENSSHIELD®
Tile Backer

Lifetime Limited Tile Installation Warranty

Georgia-Pacific Corporation ("GP") warrants to the initial homeowner/consumer ("Owner") of DensShield® Tile Backer installed in the Owner's dwelling, that, subject to the conditions and limitations specified below, DensShield (1) will be free of manufacturing defects that make it unsuitable for its intended use; (2) will not crack, chip or delaminate; (3) will not decay as a result of exposure to moisture, and (4) that when DensShield has been used as a tile substrate, the integrity of the tile installation will remain intact, provided the tile is installed according to Georgia-Pacific installation instructions which are consistent with Tile Industry standards. This warranty is for the life of the Owner and is non-transferable.

This limited warranty shall not apply to and GP shall not be liable for any damages occurring as a result of:

1. DensShield not having been stored or installed in accordance with GP installation instructions, standard building practices, and all building codes. (Such installation instructions are available from the selling dealer and from the address below.)
2. Damage to DensShield resulting from causes other than normal use conditions, such as improper handling, misuse or abuse after installation, impact of falling objects, vandalism, earthquake, hurricane, tornado, flood, fire, other acts of God, and failure or distortion of a wall or the foundation of the structure (including settling of the structure or movement of framing members).
3. Any defect, damage, failure or aesthetic appearance, of the tile or repair of grout applied to joints, the tile, etc. applied or attached to DensShield at any time, which is not a direct result of a failure of the DensShield substrate.
4. Any consequential or incidental damage to DensShield resulting from repair to surfaces installed over DensShield, such as tile, which damage is not a direct result of a failure of the DensShield.
5. Any shower assembly application where DensShield has been installed into the shower pan (note GP DensShield installation instructions).
6. Commercial construction applications. This warranty is limited to residential construction tile applications where DensShield is used as a backerboard.

In the event that DensShield does not comply with the terms of this warranty, GP will reimburse the Owner the cost of repair or replacement of the affected DensShield panels and tile assembly. All claims must be made in accordance with the claims and inspection procedure set forth below.

Any implied warranty, including warranty for a particular purpose and warranty of merchantability, is hereby limited in duration to that of the express warranty contained in this document, unless a shorter period is permitted by law. In any event, GP shall not be responsible for any incidental or consequential damages (such as personal injuries or damage to a structure or its contents). This document states the entire liability of GP with respect to DensShield.

Some states do not allow a limitation on how long an implied limited warranty lasts or do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you. This warranty gives you specific legal rights, and you may also have other rights which vary from state to state. The provisions of this warranty are applicable to DensShield sold in the United States and Canada only.

This warranty is personal to the Owner and is not assignable or transferable under any circumstances. GP's obligations under this warranty shall terminate upon the transfer of ownership of the structure containing the installed tile.

Any and all claims must be made in writing, within ten (10) days after discovery of the defect, to:

Georgia-Pacific Corporation,
55 Park Place, N.E.
Atlanta, Georgia 30303,
Attention Marketing Manager (GA029-19).

GP must be given a reasonable opportunity to inspect the claim prior to remedial action. GP shall not be liable for any cost of repair or replacement which is not authorized in writing by GP.

Installation information relative to approved practices for installing DensShield are located on the reverse of this warranty document. Further information is available through the GP Technical Hotline 800-225-6119 (8:00 a.m.-6:00 p.m. ET) or on G-P Gypsum's Web site at www.gpgypsum.com.

DensShield® Installation Instructions

Install DensShield® with grey acrylic coated side facing out. Tile should be applied to grey side.

Scoring and Cutting

The only tools needed are a blade and straight edge. Simply score with a utility knife and cut to size.

Bonding Materials

For walls and ceilings use either latex modified portland cement mortar (ANSI A118.4), or organic mastic (ANSI A136.1), or dry set portland cement mortar (ANSI 118.1)

For floors and countertops use only latex modified portland cement mortar (ANSI A118.4) compatible with selected tile.

Fastening

Use minimum 1/4" (38mm) galvanized roofing nails or 1 1/4" (32mm-47.5mm) corrosion resistant screws. Fasteners should be placed 8" (152mm) o.c. for walls and ceilings having wood or metal framing. Drive fasteners flush with coated surface. DO NOT COUNTERSINK FASTENERS.

Joint Application Materials

Where panels meet, apply 2" (51mm) wide woven fiberglass tape over joints and embed with tile bonding material.

Cut Outs

Use a standard utility knife to make necessary plumbing or other cut-outs. The cut-outs should be sealed with flexible sealants, elastomeric caulks or tile setting materials to prevent moisture penetration.






Transitions to Regular Gypsum Board

Transitions from DensShield to non-tiled, regular gypsum board can be made by taping the joints and using Georgia-Pacific setting compound.

Floors

DensShield Tile Backer can be used as a substrate in interior floor tile applications for residential and light commercial use.*

1. Laminate DensShield to exterior grade plywood sub-floor using a latex portland cement mortar applied with a 1/4" x 1/4" (6.4mm x 6.4mm) square tooth notched trowel. Stagger joints of DensShield from sub-floor joints with grey acrylic coated side facing up. A subfloor of exposure-1 APA-rated plywood floor panels having a minimum thickness of 3/4" is recommended. But exposure-1 APA-rated OSB floor panels having a thickness of 3/4" are acceptable. The subfloor should be applied over joists spaced 16" o.c. or engineered lumber spaced 19.2" o.c. Joists spaced 24"

Fastener	Fastener Length	Description	Applications
	3/4" (12.5mm) 1/2" (12.5mm) 1" (25.4mm) 1 1/4" (32mm)	Bugle head, fine thread, rust resistant, drill point drywall screw.	DensShield to heavy steel gauge (12 to 22 gauge).
	1 1/4" (32mm) 1 3/4" (47.8mm)	Bugle head, fine thread, sharp point, rust resistant, drywall screw.	DensShield to light gauge metal framing or lurring.
	1 1/4" (32mm) 1 3/4" (47.5mm)	Bugle head, rust resistant, coarse thread, sharp point screw.	DensShield to wood framing.
	1 1/4" (32mm) 1 3/4" (47.5mm)	Washerhead, rust resistant screws, drill or Hi Lo.	DensShield to heavy or light gauge metal, respectively.
	1 1/4" (32mm) 1 3/4" (47.5mm)	Hot dip 11 gauge, galvanized 1/4" (11.1mm) head nail.	DensShield to wood framing.

o.c. are acceptable when used with 1/4" T&G plywood subfloor with an L/360 deflection limitation for the span, including live and dead loads, for ceramic tile or L/720 for natural stone. Consult subfloor manufacturer for proper selection, installation and maintenance for long-term serviceability.

2. Fasten DensShield to sub-floor with 1 1/4" (38mm) galvanized roofing nails, or type W corrosion resistant screws, every 8" (203mm) in both length and width directions while mortar is still fluid. Drive fasteners flush with the surface—do not countersink. Apply 2" (51mm) 10 x 10 woven fiberglass tape over joints, embed with latex portland cement mortar. (ANSI A118.4). On new construction do not drive fasteners into joists to avoid nail pops and subsequent tile damage.
3. For 16" o.c. joist applications, use a minimum 2" x 2" floor-grade tile. For engineered joists in commercial applications, use a minimum 8" x 8" floor-grade tile. For tiles in excess of 14" x 14", consult tile manufacturer for deflection requirements.
4. Use latex modified portland cement floor grout.

Countertops

Apply leveling bed of latex modified portland cement mortar to minimum 1/4" (12.5mm) exterior grade plywood using 1/4" (6.4mm) square tooth notched trowel and install DensShield panels in the same manner as described for the floor applications.

Walls and Ceilings

Cut panel to size and make cut-outs prior to installation. Fit ends and edges tightly. Panel may be installed in either direction relative to framing.

Position DensShield panels to framing with grey acrylic coated side facing out, away from studs. Framing should be spaced 16" (406mm) o.c. for 1/2" (12.7mm) DensShield without blocking, or 24" (610mm) o.c. with blocking.

Fasteners should be spaced 6" (152mm) o.c. All joints must be covered with 2" (51mm) wide woven fiberglass tape and embedded with tile bonding material.

Limitations of Use

- DensShield Tile Backer must be installed so that tile is applied on the grey acrylic coated side of the board.
- Do not use where there is prolonged exposure to temperatures exceeding 125°F (52°C) and/or there is continuous exposure to extreme humidity, e.g., fireplaces (radiant barriers), saunas, or commercial steam rooms.
- Vapor retarders should never be installed behind DensShield.
- In retrofit, some paints or other wall coverings may constitute a vapor barrier. Such coatings or coverings must be removed or effectively perforated.
- DensShield Tile Backer should not be used as a base for nailing or mechanical fastening.
- Panels should not be installed using staples or adhesives by themselves—use an adhesive with either nails or screws.
- DensShield must not be installed into the shower pan.

Handling Precautions: For personal protection when installing DensShield, certain precautions are recommended. Due to the possibility of skin, eye and respiratory irritation from glass fibers, wear long-sleeved, loose-fitting clothes, a dust mask, gloves and eye protection. Use an approved respirator. Operations that generate high airborne fiber concentrations (over 10 fibers/ml) require additional respiratory protection. In case skin irritation occurs, wash gently with soap and warm water. Wash clothes separately from other clothing. Rinse washer thoroughly.

*As defined in the *Handbook for Ceramic Tile Installation* (Tile Council of America publication)

Patents: This product is covered under one or more of the following United States patents—4,610,563; 4,876,173; 5,148,645; 5,220,782; 5,319,900; 5,342,680; 5,371,583; 5,397,831; 5,562,187; 5,644,680; 5,704,179; 5,718,785; 5,791,103; 5,883,024; 5,981,408; 6,001,456. Foreign patents may also apply. US and foreign patents pending.

Code Compliance

- ASTM C 1178
- TCA Assemblies: Floors—F146; Walls—W245, W222; Ceilings—C311, C312; Tubs—B419; Showers—B420

For additional instructions and specifications call the GP Technical Services Hotline at 1-800-225-6119. Or visit our Web site at www.gpgypsum.com.



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